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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,363	12/22/2003	Thomas R. Maher	A42168	7972

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EXAMINER	
DOUGHERTY, ANTHONY T	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 03/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/743,363	MAHER ET AL.	
	Examiner	Art Unit	
	Anthony T. Dougherty	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,8,11 and 12* is/are rejected.

7)☒ Claim(s) *3-7,9-11 and 13-17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/22/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Page 6 line 17 states "Figs. 4-6", for clarity this should be changed to "Figs. 4, 5, and 6".

Appropriate correction is required.

Claim Objections

2. Claim 4 objected to because of the following informalities: Claim 4 recites the limitation "the at least one multiplexer" in line 4. There is insufficient antecedent basis for this limitation in the claim or its parent claims 1, and 2. It is assumed by the examiner that this is a typographical error and for examination purposes with respect to prior art this claim has been treated as if claim 4 depends from claim 3 instead of claim 2.

Appropriate correction is required.

3. Claim 9 objected to because of the following informalities: line 15 of claim 9 recites the limitation "separate signal conditioning paths", this is confusing since there is no recitation as to what these signal conditioning paths relate to. This line should have the text "for each multiplexer output" added to the end of the line, or be removed to avoid possible confusion due to redundancy with line 20 of claim 9, or some modification of lines 15 and 20 which clearly indicates what these signal conditioning paths relate to (i.e. first and third multiplexers for line 15 and second and fourth multiplexers for line 20). For prior art examination purposes claim 9 has been treated as if line 15 has been deleted from the claim.

Appropriate correction is required.

4. Claim 11 objected to because of the following informalities: Claim 11 recites "In variable condition responsive sensor system having a plurality of variable condition sense elements, the method comprising", this language is confusing and for clarity should be changed, for prior art examination purposes line 1 of claim 11 has been treated as if it reads "A method for detecting sensor faults in a variable condition responsive sensor system having a plurality of variable condition sense elements, the method comprising". Note that the underlined portions remain the same and the intended use in the preamble provides no patentable weight and therefore does not change the scope of the claim. This change or one similar indicating the intention of the method should be provided in the preamble for clarity in reading the claim.

Appropriate correction is required.

5. Claim 11 objected to because of the following informalities: Claim 11 recites the limitation "sense bridge elements" in line3. There is insufficient antecedent basis for this limitation in the claim. For examination purposes with respect to prior art this claim has been treated as if line 2 of this claim reads "sense bridge elements" instead of "sense elements".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 8, 11, and 12, rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,433,544 to Kawate et al.

With regard to claim 1 Kawate et al. discloses a variable condition responsive sensor system (see abstract), with at least one variable condition sense element having first and second outputs (see column 2 line 67 though column 3 line 1), the variable condition being one of pressure, acceleration, force, and torque (see column 2 line 58), first and second signal conditioning paths, the first output connected to the first path and the second output connected to the second path (see column 4 line 63 through column 5 line 7), memory for storing calibration and characterization data for the sense element and the signal conditioning paths (see column 5 line 9), and an interface circuit for transmitting data from the memory to the signal conditioning components for separately conditioning the signals and to an external controller to perform mathematical corrections of the conditioned signals and for comparing the conditioned signals of the sense element (see column 5 line 7-20 & Figure 2a & column 3 line 33-40).

With regard to claim 2, and applying the rejection of claim 1 above, Kawate et al. discloses the variable condition sense element comprises first and second half bridges, the first half bridge providing the first output and the second half bridge providing the second output (see column 2 line 65 through column 3 line 13 & Figure 1).

With regard to claim 8, and applying the rejection of claim 1 above, Kawate et al. discloses the variable condition is pressure (see column 2 line 58).

With regard to claim 11 Kawate et al. discloses a method for detecting sensor faults in a variable condition responsive sensor system having a plurality of variable condition sense bridge elements (see abstract), by forming each of the sense bridge elements into two portions each portion having an output node output (see column 2 line 65 through column 3 line 13 & Figure 1), separately conditioning output signals from each output node of a selected sense element (see column 4 line 63 through column 5 line 7), and comparing the separately conditioned signals of the portions of the selected sense element with each other to determine whether the conditioned signals come within selected tolerance bands (see column 5 line 7-20 & Figure 2a).

With regard to claim 12, and applying the rejection of claim 11 above, Kawate et al. discloses the variable condition sense elements each comprise a bridge having two halves, each half having one of the output nodes (see column 2 line 65 through column 3 line 13 & Figure 1).

Allowable Subject Matter

8. Claims 9, and 10 allowable if the claim objection above is overcome.

9. Claims 3-7, and 13-17 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the allowance of claims 3-7 is the inclusion of the limitations of a multiplexer with addressable ports connected to the outputs of each half bridge of the plurality of sense elements, the multiplexer having output ports, with an output port connected to each signal conditioning path. It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 9, and 10 is the inclusion of the limitations of an electronic circuit having first, second, third, and fourth multiplexers, each having an output and a plurality of address input positions, a respective independent variable resistor connected in series between the voltage source and the output of each of the first and third multiplexers, the bias node of each half bridge of each sense element connected to a respective multiplexer address position of the respective first and third multiplexers, the minus output node of each sense element connected to a respective multiplexer address position of the second multiplexer, the positive node of each sense element connected to a respective multiplexer address position of the fourth multiplexer, a respective separate signal path connected to the output of each multiplexer, an analog to digital converter having a plurality of inputs and an output, the signal paths being connected to the inputs of the analog to digital converter, a data register having an input and an output, the output of the analog to digital converter connected to the input of the data register, a data transfer circuit connected to the data register and having connections for an external controller, said data transfer circuit capable of

transferring data to and from the external controller, and a memory, the memory being connected to the data transfer circuit, the memory providing analog trim settings for the sense element signal paths and data for the external controller enabling the external controller to perform mathematical compensation for the variable condition sense element signals.

The primary reason for the allowance of claim 13 is the inclusion of the method step of comparing separately conditioned signals by subtracting the conditioned signal of one half bridge from the conditional signal of the other half bridge of a sense element and taking the average of the difference in the two conditioned signals. It is this step found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 14 is the inclusion of the method steps being detecting sensor fault conditions by obtaining electronic calibration data for each sense element during manufacture of the sensor system and storing that information in memory, connecting the outputs of the bridge halves of a selected sense element to the respective signal conditioning circuit paths using basic calibration data from the memory. It is this step found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims15-17 is the inclusion of the method steps being detecting sensor faults by forming an electronic circuit having multiplexers, obtaining

electronic calibration data for each half bridge sense element during manufacture of the sensor system and storing that information in memory, selecting an address of the multiplexers for connecting the output of a selected half bridge of a selected sense element to the respective signal conditioning circuit path and to transmit basic calibration data to the signal conditioning components in the signal conditioning path. It is these steps found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6040779 to Pfaff et al. because it teaches sensor fault detection by comparison and subtraction of a two half bridges of a full bridge.

U.S. Patent No. 6765391 to Corkum et al. because it teaches sensor fault detection by half bridge separate compensation and comparison of a sense element without memory storage or external mathematical operations and no applicable prior art date.

U.S. Patent No. 6422088 to Oba et al. because it teaches a sensor fault detection circuit involving half and full bridge sense elements and compensation channels with memory interaction.

U.S. Patent Application Publication No. US 2002/0103613 A1 to Maher et al. because it teaches sensor fault detection using half bridges of a full bridge sense element connected to

multiplexers wherein the signals from the half channels are mixed in compensation channels for analysis.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony T. Dougherty whose telephone number is (571) 272-2273. The examiner can normally be reached on Monday through Friday from 8 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

atd

BRYAN BUI
PRIMARY EXAMINER

3/2/05